



Common to North Carolina

Sea Gran Depositon

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Shells pictured on front and back cover photo (from left to right) are: Lettered Olive, Georgia Tellin, *Phalium coronadoi* (Crosse)—This shell does not have a common name—, Atlantic Moon Shall, Atlantic Deer Cowrie and Junopia

NOTE

This is the second in a series of booklets published by the North Carolina Department of Natural and Economic Resources on marine life common to North Carolina waters. The first, "Marine Fishes Common to North Carolina" by Frank J. Schwartz and Jim Tyler, was published in 1970.

Sea Grant Depository Shells common to North Carolina

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INTRODUCTION

Those associated with the sea, its beaches and its products, frequently see things unfamiliar to them, and often, they have no quick way of knowing or understanding what they see. Such incidental knowledge may not seem important, but if it stimulates a person to observe his environment more closely and thereby gain an understanding of it, he or she may become a more profitable fisherman, a better teacher, or a more thoughtful inhabitant of this earth. To this end this booklet was produced.

About 700 different kinds of mollusks (shell-bearing animals) are reportedly known to exist in our North Carolina estuarine and marine waters.

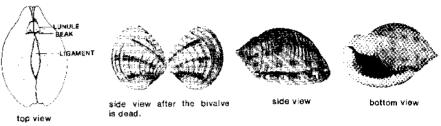
The term "seashell" here specifically refers only to those members of the Phylum Mollusca having a hard calcareous outer covering (rarely internal). By definition, not included in this booklet are: 1. Those adult mollusks without a hard calcareous outer covering; such as, octopi, most squid, sea-slugs, etc. 2. Those non-molluscan marine animals having a hard outer surface - crabs, lamp-shells, coral, etc. Shelled mollusks smaller than 1/2 inch are generally not included as few persons have a high-powered lens or microscope quickly available. Some rare seashells are included; experience has shown many to be rare only because shell collectors were not present when they were caught by our offshore fishermen.

Beach collecting for shells washed ashore is best done in early spring after winter storms and before the tourist season arrives. Very satisfying collecting can be done on the intertidal flats of our numerous lagoons and estuaries. Here, in the interest of conservation, restraint should be practiced when collecting live specimens. Collecting from decks of offshore fishing boats, and at dealers handling fish, shrimp, or offshore scallop catches should not be overlooked. The only known living specimen of the rare Phalium coronadoi (Crosse) was found by Dr. A. F. Chestnut, Director of the U.N.C. Institute of Marine Sciences, on the deck of a trawler which had just been fishing off our Wimble Shoals (just below Oregon Inlet). An asterisk, "*", is used in the shell description to additionally point out shells which have been brought in by the Calico Scallop fishery. Generally, when North Carolina is listed here as the most northern range (distribution) of a seashell, the shell can be collected only south of either Cape Hatteras or Cape Lookout; the converse is true for those few with North Carolina listed as their southern limit.

How to Use Booklet to Identify Your Seashells

The booklet is in two major sections: pages 4 to 20 are concerned only with bivalves (mollusks having two shells; pages 21 to 35 are concerned with mollusks having only one shell (generally Gastropods - snails).

First check to see if the shell in question is a bivalve or a gastropod.



BIVALVE (clam-like)

GASTROPOD (enail-like)

Animal has two shells. The shells are held together tightly when the creature is alive. They are attached along one side by a ligament. Unless blyalves are caught alive, collectors usually find only one of a pair.

Animal has only one shell.

Most terms used are illustrated on inside of back cover of booklet.

FOR EASE IN IDENTIFICATION, the booklet is set up primarily as an outline (called a key by taxonomists). Example of use:

You have a snail-like shell which is almost flat, is not attached to other shells, has no umbilicus (see Fig. 91) and is white. Also, you have, in the outline, been referred previously to 6 from 5a.

- 6a. Shell compressed......7.
- 6b. Shell length and width nearly equal, 8.

Obviously 6a is a better choice than 6b so go to 7 and not 8.

- 7a. Pieces of shells......cemented to shell surface.
 - Atlantic Carrier Shell
- 7b. Deep umbilicus.....
 - Common Sundial
- 7c. No deep umbilicus,

Common Baby's Ear

Maculated Baby's Ear

Here 7c is the better choice and from the descriptions of the two Baby's Ears, the first would be selected since it is the only one that is white.

Where space limitations permitted, described shells are illustrated. Sizes listed in descriptions are approximate maximum sizes of specimens known to have been collected in North Carolina. For those wishing more information, "Seashells of North America, a guide to field identification" by R. Tucker Abbott, published in 1968 by the Golden Press, New York, N.Y., is highly recommended.

BIVALVES

1a. Body soft and worm-like, burrowing into wood, shells small, Fig. 1.

Ship-worms. Family Teredinidae

Over slx kinds exist in N. C. waters, identification difficult, cause millions of dollars of damage to marine properties every year.

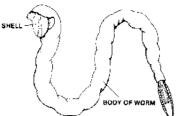


Fig. 1
Ship-worm

- 1b. Body not soft and worm-like but with shells covering most of body 2.2a. Hinge with numerous teeth, teeth may be chevron-shaped, Figs. 2, 3, 9 3.
- 3a. Hinge curved, circular shell, Fig. 2.

GIANT AMERICAN BITTERSWEET Glycymeris americana (DeFrance) Fig. 2

Length: 3 3/4 in. Range: N. C.—Fla. Live specimens covered by dark brown velvet-like skin (periostracum); indistinct broad radial ribs sculptured with radiating scratches.

Common—beaches near and south of Cape Fear; occasional—offshore fishing boats; dense concentrations fiving at 75 ft. depth off Cape Fear. Species well named, thus can not be considered a commercial possibility.

COMB BITTERSWEET Tucetona pectinata (Gmelin) Length: 3/4 in. Range: N. C.—Fla. Strong smooth ribs. Common—beaches.

Two other species—the Spiral Bittersweet, Glycymeris spectralis Nicol and the Atlantic Bittersweet, Glycymeris undeta (Linne) occur speradically off our coast.

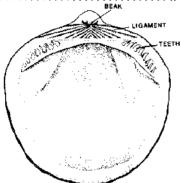


Fig. 2 Glant American Bittersweet

3b. Hinge almost a straight line (note Fig. 3), elliptical or quadrate shaped shell. aa. Bottom edge not cut by crenulations (teeth).

TURKEY WING OR ZEBRA ARK Arca zebra Swainson

Length: 3 1/2 in. Range: N. C.—Brazil. Posterior (rear) ribs not beaded, zebra-stripe markings on exterior, live specimens covered by a dense periostracum (outer skin) and/or encrusting organisms. Common—beaches; frequently attached to shell or rocks on offshore fishing grounds or inshore jettles.

MOSSY ARK Area imbricata Bruguiere

Length: 2 1/2 in. Range: N. C.—West Indies. Ribs weaker than Turkey Wing and generally beaded, part of lower edge strongly concave, no zebra-stripe markings, easily confused with Turkey Wing; like Turkey Wing in exterior covering and habitat.

WHITE-BEARDEO ARK Barbatia candida (Helbling) Length: 1 in. Range: N. C.—Brazil. Numerous fine rough ribs covered by light yellow-brown periostracum. Occasional—attached to rocks in offshore waters.

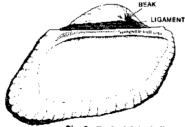


Fig. 3 Typical Ark shell



Fig. 4 Turkey Wing Outer view

WHITE MINIATURE ARK Barbella domingensis (Lamarck) Fig. 5.

Length: 1 1/4 in. Range: N. C.—Fla. Concentric ridges stronger than ribbing. Occasionally common—offshore jetties, under rocks and on shells.

Fig. 5 White Ministure Ark Ouler view



bb. Bottom edge cut by crenulations (toothed), note Fig. 3.

PONDEROUS ARK Noetia ponderosa (Say) Fig. 6. Length: 2 1/2 in. Range; Va.—Texas. Square ponderous-shaped; ligament wide, cut by transverse lines (lines at a 90° angle to length of ligament); ribs not beaded but cut by fine line; fresh shells covered by black velvety periostracum. Occasionally common—beaches. Iiving offshore*.

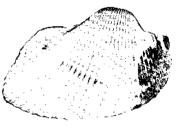
Flg. 6 Ponderous Ark Outer view



CUT-RIBBED ARK Anadara Henosa floridana (Conrad)

Length: 4 1/2 in. Range: N. C.—Texas. Large rectangular-shaped, 30 or more ribs, ribs not beaded but cut by fine line, fresh shells covered by dense mossy-like periostracum. Occasional—beaches; common—living offshore.

Fig. 7 Cul-ribbed Ark Outer view



1NCONGRUOUS ARK Anadara brasiliana (Lamarck) Fig. 8.

Length: 2 1/2 in. Range: N. C.—Brazil. 26-28 ribs—some strongly sculptured with bar-like beads, ligament in front and in back of beak. Very common—offshore beaches.

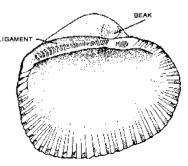
Fig. 8 Incongruous Ark Outer view



BLOOD ARK Anadara ovalis (Bruguiere) Fig. 9.
Length: 2 1/4 in. Range: Mass.—Texas. 26 to 35 smoothish ribs not crossed by any strong bars, ligament area
completely in back of beak, teeth in hinge distinctive for
this ark—extend only slightly beyond beak. Animal unusual in that it has red blood—thus its name. Very common—offshore beaches.

TRANSVERSE ARK Anadara transversa (Say)
Length: 1 in. Range: Mass.—Texas. 30-35 ribs, ligament both in front and in back of beak; ribs may be beaded—not cut lengthwise by fine line. Occasional—attached to rocks, shell, driftwood offshore, in sounds and inlets.

Fig. 9 Blood Ark Inner view



4a.	Found living in low salinity areas (almost freshwater): Albemarle Sound and
	tributaries, Pamlico River, Neuse River, etc
4b.	Hinge line with ears, note Figs. 11, 15
4c.	Large, wedge-shaped, Figs. 16, 17, thin fragile shell with pearly interior 6.
4d.	Front top margin of shell reflected outward (rolled out) Fig. 18
4e.	Shell pear or cigar shaped - generally wide and more than twice as long as high, beaks at one end of shell
4f.	Long shell (not cigar or pear shaped) - generally more than twice as long as high, narrow width
4g.	Large, almost rectangular shape - one end rounded, the other blunt and concave.

ATLANTIC GEODUCK Panopea bitruncata Conrad Fig. 10.

Length: 7 1/4 in. Range: N. C.—Texas. Occasionally washed up on beaches, living specimens extremely rare—considered extinct until recently.





5a. Triangular shape, hinge longest part of shell.

ATLANTIC WING OYSTER Pteria colymbus (Roding) Fig. 11.

Length: 3 3/4 in. Range: N. C.—Brazil. Brown exterior, pearly interior. Occasional—beaches, commonly attached to see whip strands in sounds and offshore*. Closely related to Pearl Oysters.

Fig. 11 Atlantic Wing Oyster Outer view



Scallop-shaped, hinge not longest part of shell.
 aa. No ribbing—occasionally very fine ribbing.

ATLANTIC DEEP-SEA SCALLOP Placopecten magel-lanicus (Gmelin) Fig. 12.

Length: 6 in. Range: Labrador.—N. C. Smooth surface, top valve reddish brown—sometimes rayed, bottom valve white, albinos occasionally noted. Fished commercially offshore—not known below Cape Hatteras.



Fig. 12 Atlantic Deep-sea Scallop Outer view

bb. Ribs present-smooth.

RAVENEL'S SCALLOP Pecten reveneti Dall Fig. 13. Length: 2 3/4 in. Range: N. C. - West Indies, Lower valve (shell) quite cupped, upper valve flat (not due to water pressure pressing down on a sick Calico Scallop, as suggested by local supersition). Common—living offshore*.



Fig. 13 Ravenel's Scallop Outer view

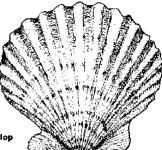
Calico Scallop Argopecten gibbus (Linne)

Length: 3 in. Range: Del. - Gulf of Mexico. Both valves (shells) cupped, upper valve with mixed shades of red in stripes or blotches on a yellow or pinkish background. Similar in shape and sculpturing to Bay Scallop (Fig. 14). Common - beaches, fished commercially offshore east of Cape Lookout and southwest of Beaufort Inlet at about 100 ft. depths. (Lives only in ocean).

Atlantic Bay Scallop Argopecten irradians (Lamarck) Fig. 14

Length: 3½ in. Range: Mass. - Mexico. Similar in shape and sculpturing to Calloo Scallop; upper valve (shell) - gray, brown or blackish with sometimes only upper surface of ribs colored. Lives only in sounds and estuaries where it forms a major commercial fishery.



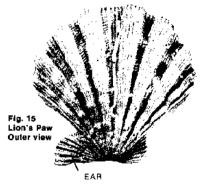


cc. Ribs roughened by large nodules, numerous small spines or scales.

Lion's Paw Lyropecten nodosus (Linne) Fig. 15 Length: 4 3/4 in. Range: N. C. - Brazil. Ribs with large nodules; shell resembles paw of a large cat; orange, red or black. Rare - offshore beaches, occasional - living offshore*. Reported to be excellent eating.

Rough Scallop Aequipecten muscosus (Wood)

Length: 1 3/4 In. Range: N. C. - West Indies. Numerous erect scales or small spines on ribs, dark red, typical scallop shape. Occasional - living offshore*.



6. Pen Shells.

After winter storms, three ocean species frequently washed onto offshore beaches; Rigid Pen Shell also found living in our sounds. All may reach 10 inches length, thard to keep in shell collections because of brittleness of shells. Meat edible and considered valuable in some parts of world, only shell-fish in our marine waters known to produce a valuable pearl. Byssat threads, which help hold Pen Shells in the sand, have been woven into cloth for small garments in Mediterranean countries.

Saw-toothed Pen Shell Atrina serrata Sowerby Fib. 16 Range: N. C. - Columbia. About 30 ribs - each covered with small spines.

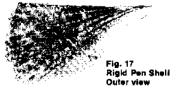


Rigid Pen Shell Atrina rigida (Lightfoot) Fig. 17

Range: N. C. - Florida. Less than 20 ribs - some containing large spines, similar to Half-naked Pen Shell except on mid interior of shell, the large muscle scar borders the edge of the inner shiny (nacreous) area which extends to the narrow beak end.

Half-naked Pen Shell Atrina seminuda (Lamarck)

Range: N. C. - Argentina. Similar to Rigid Pen Shell except on mid-interior of shell, the large muscle scar is not on the edge but is surrounded by the shiny (nacreous) area which extends to the narrow beak and.



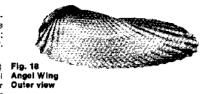
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7. Boring Clams.

Angel Wing Cyrtopleura costata (Linne) Fig. 18 Length: 5 1/2 in. Range: N. J. - Brazil. White, reflected hinge on top surface not braced by numerous partitions, both ends rounded. Occasional - beaches; lives offshore and in estuaries; clay or mud burrower.

Campeche Angel Wing Pholas campechiensis (Gmelin)
Length: 2 3/4 in. Range: N. C. - Brazil, Like Angel Wing
Wing except numberous partitions brace upper
reflected hinge. Occasionally common - beaches near
and south of Cape Fear.

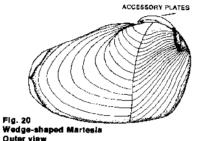
Fallen Angel Wing Barnea truncata Say Fig. 19 Length: 3 ¾ in. Range; Maine - Brazil, Neither end rounded, live specimens have loose accessory plates (note Fig. 20) on top of where the hinge should be. Occasional - beaches; bores into mud, clay, soft wood.





Wedge-shaped Martesia Martesia cunelformis Say Fig. 20 Length: 1/2 in. Range: N. C. - Brazil. Series of loose accessory plates on top of hinge line, ridge running from top to bottom separates exterior sculpture into two areas. Common - submerged driftwood burrower. One of about six small boring clams listed from

our waters - some shell and/or rock burrowers. Identication based largely on characteristics of accessory plates.



8a. Strong ribbing at beak end of shell, hinge teeth present.

False Angel Wing Petricola pholadiformis Lamarck Fig. 21

Length: 2 1/4 in. Range: Canada - Gulf of Mexico. White, variable in width particularly at the non-beak end; looks like a small Angel Wing (p. 8), note absence of rolled out hinge area. Common - beaches, in intertidal area a hard clay or peat borer.



Fig. 21
False Angel Wing
Inner view of hinge

8b. Weakest ribbing, when present, at beak end of shell; hinge teeth absent (crenulations similar to weak teeth may be present).

Common Awning Clam Solemya valum (Say) Fig. 22 Length: -1 in. Range: Nova Scotia - Fla. Smooth and fragile, brown with some light radial rays. Common intertidal sand flats of our sounds; shells rare on beaches.

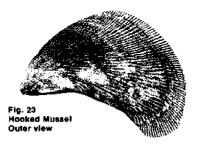
aa. Ribbing present.

Scorched Mussel Brachidontes exustus (Linne) Length: 3/4 in. Range: N. C. - West Indies. Narrow end not strongly hooked, exterior light brownish-yellow. Frequently attached to cysters or other shell and rocks in estuaries.



Hooked Mussel Brachidontes recurvus (Rafinesque) Fig. 23

Length: 1 3/4 in. Range: Mass. - West Indies. Narrow end strongly hooked in shape, beak area with some tooth-like crenulations, exterior color - dark grayish-black. Same habitat as Scorched Mussel.



Atlantic Ribbed Mussel Modiolus demissus (Dillwyn) Fig. 24

Length: 6¼ in. Range: Nova Scotla - Fla. No tooth-like crenulations in beak area, dark brown to purple exterior, interior blue-white, strong heavy ribs. Large living beds embedded in brackish water marshes.



Atlantic Ribbed Mussel
Outer view

bb. Ribbing not present, top and bottom edges not parallel to each other.

Common Blue Mussel Mytitus edutis Linne Fig. 25
Length: 2 in. Range: Arctic Ocean - S. C. Exterior
bluish black, small teeth present just under beak.
Common - north of Cape Hatteras; adults rare - south
of Cape Hatteras. Attached to rocks in mouths of
estuaries and offshore. The popular edible mussel of
Europe; has a large potential for advanced aquaculture.

Paper Mussel Amygdalum papyria Conrad

Length: 1 in. Range: Maryland - Texas. Shiny light blue or tan with brown cobwebby design. Occasional - living offshore.

Tulip Mussel Modicius americanus (Leach)

Length: 1 3/4 in. Range: N. C. - West Indies. Deep chestnut colored splotch in lower front area, hairy lightbrown periostracum, similarly shaped but not as large and heavy as N. Horse Mussel. Common - beaches after storms; attached to rocks and shells in sounds and offshore.

Northern Horse Mussel Modiolus modiolus (Linne) Fig. 26 Length: 4 1/2 in. Range: Artic Seas - Fla. No chestnut colored splotch on lower front area, coarse and thick brown-black periostracum. Occasional - attached to rocks or shell offshore.





cc. Cigar-shaped. Found boring into submerged wood, thick shell, bases of coral lumps, or sometimes rock.

Giant Date Mussel Lithophaga antiliarum (Orbigny) Length: 3 1/4 in. Range: N. C. - British Honduras. Light yellow-brown, sculptured with light verticle lines, ends rounded. Not common; off Cape Lookout in coral lumps. Scissor Date Mussel Lithophaga aristata Dillwyn Fig. 27

Length: 1 1/4 in. Renge: N. C. - Brazil. Extended ends look like crossed fingers or end of a small scissors. exterior generally covered by a white calcareous deposit. Frequent - offshore boring into coral or thick shells.



FIg. 27 Scissor Date Mussel Outer view

Mahogany Date Mussel Lithophage bisulcate (Orbigny) Fig. 28

Length: 1 in. Range: N. C. - Brazil. Exterior surface divided by oblique line, exterior white calcareous deposit present, exterior ends not crossed. Common sounds and offshore.

Cinnamon Chestnut Mussel Botula fusca (Gmelin)

Length: 1/2 in. Range: N. C. - West Indies. Strong concentric growth lines, lower edge concave. Common living offshore"; rock or shell borer.



9a. Crescent-shaped with one end shaped like a small tube.

Say's Pandora Pandora trilineata Say Fig. 29 Length: 1 in. Range: Va. - Texas. One of five similar species found in sounds and shallower offshore areas; may be common, rarely seen by collectors.



9b. Length greater than four times the height, blunt ends, looks like an oldfashioned razor.

Atlantic Jackknife Clam Ensis directus Conrad Fig. 30 Length: 5 in. Range: Canada - S. C. Six times as long as high (a similar but smaller species, the Small Jackknife Clam - Ensis minor Dall, also reported from Fig. 30 our waters, is nine times as long as high); olive to Atlantic Jackknife Clam brown outer skin, white and violet underneath. Common - Outer view beaches (particularly above Cape Hatteras), muddy sand burrower in our sounds and offshore. Excellent eating.



Green Jackknife Clam Solen viridis Say

Length; about 1 1/2 in. Range; Rhode Island - Texas. Only four or five times as long as high, upper border almost straight - not as concave as Atlantic Jackknife Clam, green. Occasional - sounds and offshore beaches.

- 9c. Rectangular shape, shell length less than 4 times height, beak not quite central in location.
 - aa. Oblique lines overlaying regular concentric growth lines.

Corrugated Razor Clam Solecurtus cumingianus Dunker Fig. 31

Length: 2 3/4 in. Range: N. C. - Fla. Occasional living offshore*.



Fig. 31 Corrugated Razor Clam **Outer view**

bb. No oblique lines overlaying regular concentric growth lines.

Purplish Tagelus Tagelus divisus Spengler Fig. 32 Length: 1 1/4 in. Range: Mass. - Texas. Inner purplish raised rib (weak) running from beak to lower shell edge; yellowish periostracum with purple rib showing through. Common - beaches; lives in sounds and offshore.

Fig. 32 **Purplish Tagelus** Outer view

Stout Tagelus Tagelus plebeius (Lightfoot)

Length: 3 1/2 in. Range: Mass. - Fla. Interior without verticle raised rib running down from beak, exterior without purplish rays, outline shape somewhat similar to Corrugated Razor Clam. Common - offshore beaches, sounds.

9d. Ends rounded, shell not cresent or rectangular shaped, beak not centrally located (about 1/3 rd in from end of shell).

Florida Coquina Donax variabilis Say Fig. 33 Length: 1 in. Range: Virg. - Texas. No external raised ribbing on shell except possibly at beak end of shell; hinge teeth present; extremely variable coloration white, yellow, purple, red, etc., in varying shades of solid, ringed or rayed condition. Extremely common intertidal zone, sandy ocean beaches. Makes an excellent scup. Two other species - Donax fossar and Donex pervula recorded from N. C. waters.



NOTE PURPLE RIB

Fig. 33 Florida Coquina **Outer view**

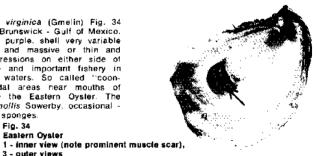
Glassy Lyonsia Lyonsia hyalina Conrad

Length; 3/4 in. Range; Canada - S. C. Fine ribbing covers shell, dull white, very fragile, no hinge teeth, sand grains frequently attached to outer skin (periostracum). Living - estuaries, offshore. A second species, Lyonsia beana, occasionally found offshore.

No hinge teeth present
ribs

Eastern Oyster Crassostrea virginica (Gmelin) Fig. 34 Height: 8 in. Range: New Brunswick - Gulf of Mexico. Muscle scar generally dark purple, shell very variable in shape - can be thick and massive or thin and brittle, no pimple-like depressions on either side of the hinge. Basis of large and important fishery in North Carolina's estuarine waters. So called "coonoysters", found in intertidal areas near mouths of sounds and estuaries, are the Eastern Oyster. The Sponge Oyster, Ostrea permollis Sowerby, occasional living offshore", lives only in sponges.

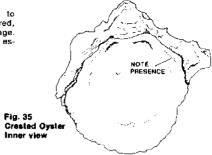
Eastern Oysler



3 - outer views



Created Oyater Ostrea equestris Say Fig. 35 Height: 2 in. Range: Va. - Texas. Very similar to Eastern Oyster, muscle scar generally not colored, small pimple-like depressions on either side of hinge. Common - high salinity areas (mouths of sounds, estuaries and offshore). Not utilized commercially.



11b. Several small muscle scars very close to each other, living animal attached but not cemented to another hard surface.

Atlantic Jingle Anomia simplex Orbigny Fig. 36

Height: 1 1/2 in. Range: N. Y. - West Indies. Shell thin and almost transparent; variously colored - white, yellow, yellow-orange, silvery black; top shell whole and convex in shape; bottom shell smaller, flat, very fragile, and with a slotlike hole near the hinge line; frequently assumes sculpturing pattern of the surface to which it is attached. Upper valves common on beaches.

A small prickly kind, the Prickly Jingle - Anomia acuteata (Gmelin), reported off coast.

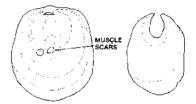


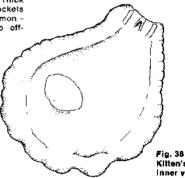
Fig. 36 Atlantic Jingle Inner view of top shell on left, lower shell on right

12a. Flat shells, ribs with few if any spines.

Kitten's Paw Piicatula gibbosa (Linne) Figs. 37, 38 Length: 1 1/2 in. Range; N. C. - Gulf States. Thick shell, two strong teeth in upper valve fit into sockets of lower valve, one muscle scar, well named. Common offshore beaches; living specimens cemented to offshore shells and/or rock.





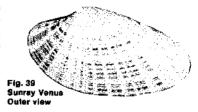


Kitten's Paw inner view

Deeply cupped shells, ribs with many prominent raised spines
Lunule and palial sinus present
Lunule, pallial sinus or both, not present
Rough raised concentric ridges - leafy type sculpture, may include some radial ribbing, lower valve attached to hard surface and quite cupped in
shape, upper valve a semi-flat lid to lower valve
Radial ribbing present (refers to 16b only)
Eggshell-like surface, circular or higher than wide-ovate shape
Sculpture of fine concentric ridges or growth lines; if smooth, not a higher
than wide-ovate shape
Oval shape and smooth shiny surface.

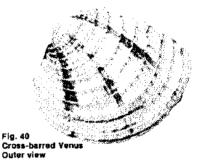
Calico Clam Macrocallista maculata (Linne) Length: 3 1/2 in. Range: N. C. - Brazil, Checkerboard coloration with dark brown on light tan or pinkish tan. Occasional - beaches south of Cape Hatteras; known living - 50 & 120 ft, depths south of Cape Lookout*.

Sunray Venus Macrocallista nimbosa (Lightfoot) Fig. 39 Length: 6 1/2 in. Range: N. C. - Texas. Greyish salmon color, frequently with dull lavender radial stripes (colors fade rapidly in the sun). Common - beaches below Cape Hatteras (particularly Cape Lookout); live collected - intertidal zone to +65 ft. depth, sounds. Excellent chowder clam - fished commercially in Florida.



15b. Ribbing present, lower shell edge toothed (crenulated).

Cross-barred Venus Chione cancellata (Linne) Fig. 40 Length; 1 3/4 in. Range; N. C. - Brazil. Palial sinus small, strong concentric ridges crossing strong radial ribbing, interior usually with strong purple area, occasional specimens have a few lavender exterior radial stripes on normal white base color. Very common sand bottom (sounds, offshore shallow waters). Edible but rarely eaten - said to be sweeter tasting than Northern Quahoo.



Lady-in-waiting Venus Chione intapurpurea Conrad Fig. 41 Length: 1 1/2 in. Range: N. C. - Texas. Sculptured

mainly by concentric ridges, ridges serrated or toothed along lower edge - thus appear to be crossed by light ribbing, exterior colored frequently by broken radial stripes of lavender. Occasional - beaches, living offshore".



15c. Concentric sculpture of large heavy ridges, lower edge of shell not toothed.

Fig. 41

Imperial Venus Chione latitirata Conrad Fig. 42 Length: 1 1/2 in. Range: N. C. - Texas. Ridges rounded and often sharply shelved at top, tan exterior broken up by lavender blotches and radial stripes. Occasional - beaches, frequent - living south of Cape Hatteras at 60 - 120 ft. depth*.



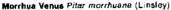
15d. Concentric sculpture of line ridges, shell not a flat disk.

Northern Quahog or Hard Shell Clam Mercenaria mercenaria (Linne) Fig. 43

Length: 4 1/2 in. Range: Canda - Texas. Lower edge of shell toothed, exterior central area smooth, interior frequently with some purple, heavy shell. Common - beaches, sounds, and mouths of estuaries near ocean. Basis of large commercial fishery in our waters: large marine farming potential.

Southern Quahog Mercenaria campechiensis (Gmelin) Length: 4 3/4 in. Range; Va. - Texas. Closely related to Northern Quahog, exterior central area of the shell not smooth but sharply ridged, interior all white. Common - offshore beaches; living - 40-50 ft. depth offshore near inlets. Bed between Cape Lookout and Beaufort Inlet at one time was fished commercially.

Two above species seem to hybridize in our inlets; hybrid specimens may reach six inches in length.



Length: 1 1/2 in. Range; Canada - N. C. Looks like small quahog, lower edge of shell not toothed, thin tat shell, dull gray. Common - offshore beaches.

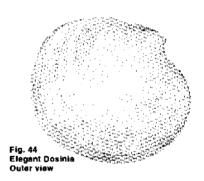


15e. Concentric sculpture of fine ridges, shell a flat disk.

Disk Dosinia Dosinia discus (Reeve)

Length: 3 in. Range: Va. - Yucatan. Similiar to Elegant Dosinia, about 50 ridges per inch. Common - beaches; living in sounds and just offshore in shallow sand-flats.

Elegant Dosinia Dosinia elegans Conrad Fig. 44
Length: 4 in. Range: N. C. - Yucatan About 25 ridges
per inch. Lives off coast in deeper waters than that
reported for the Disk Dosinia; common - Cape Lookout
beaches.



16a. Many prominent raised spines on ribs, both valves deeply cupped.

Florida Spiny Jewel Box Arcinella cornuta (Conrad) Fig. 45

Height: 2 in. Range: N. C. - Texas, Lunule prominent, adults not cemented to any hard surface, while. Occasional - offshore beaches, fiving offshore*.



Fig. 45
Florida Spiny Jewel Box
Outer view

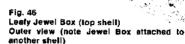
16b. Rough sometimes indistinct ribbing and/or concentric ridges present, no lunule, lower valve attached to hard surface and quite cupped in shape, upper valve a semi-flat lid for lower valve.

Little Corrugated Jewel Box Chama congregata Conrad

Height: 1 1/4 in. Range: N. C. - Texas. Beaks pointing to right, surface sculpture of low wavy radial cords. Occasional shells - offshore beaches, common - attached to living or dead shell and rocks in offshore waters*.

waters .

The rarer **Leafy Jewel Box**, Chama macerophylla Gmeilin Fig. 46, differs in having leafy (foliated) and sometimes spiny sculpture; similar habitat. Height: 11/2 in. Range: N. C. - West Indies.



Atlantic Lett-handed Jewel Box Pseudochama radians (Lamarck) Fig. 47

Height: 2 1/4 in. Range: N. C. - West Indies. Beaks pointing to left, almost a mirror image of the Leafy Jewel Box. Occasional - beaches, attached to shell and rocks in shallow and deep offshore waters.

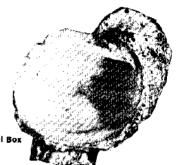


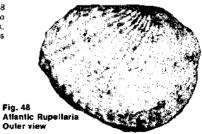
Fig. 47
Atlantic Left-handed Jewel Box
Inner view

17a. Concentric ridges as strong or almost as prominent as ribbing.

Cancellate Semele Semele bellastriata (Conrad)
Length: 3/4 in. Range: N. C. - West Indies. Cream
color with pink - purple specks or blotches. Occasional living known offshore at depths up to about 300 ft.
(Note closely related species on p. 19).

- 17c. Patial sinus present, beak about 1/4 of length from front end, no good lateral teeth, found boring into rock or shell.

Atlantic Rupellaria Petricola typica (Jonas) Fig. 48 Length: 1 in. Range: N. C. - West Indies. White to grayish, very variable in shape. Common - offshore rock, shell or coral borer*. (Note closely related species listed on p. 8).



- - 15

Spiny Paper Cockle Papyridea soleniformis (Bruguiere) Fig. 49

Length: 1 1/2 in. Range; N. C. - Brazil. Thin shelled, not deeply cupped, brownish orange. Occasional - beach specimens from Cape Lookout south.



18b. Eggshell-like surface with either very light or no ribbing, circular or higher than wide-ovate shape.

Common Egg Cockle Laevicardium laevigatum Linne Fig. 50

Height: 2 3/4 in. Range: N. C. - Brazil. Thin shelled, cream with brown tints. Common - living known at 150 ft. offshore depths", less common - beaches.

Ravenel's Egg Cockle Laevicardium pictum (Ravenel) Height: 1 in. Range: N. C. - Gulf of Mexico. Oblique shape. Common - offshore.

Morton's Egg Cockle Laevicardium mortoni (Conrad) Height: 3/4 in. Range: Mass. - Guatemala. Almost round shape. Common - sounds and estuaries.

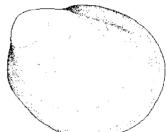


Fig. 50 Common Egg Cockle Outer view

18c. Shell with spines or elevated scales on ribs.

Prickly Cockle Trachycardium egmontianum (Shuttleworth) Fig. 51, 52

Height: 2 1/2 in. Range: N. C. - Fla. Shell uniformly covered by ribs bearing raised scales which cover more than half of each rib; interior - salmon, vivid pinks and purple. Occasionally common - beaches, lives in mouths of estuaries and shallow offshore waters.

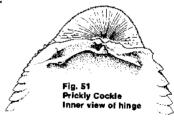




Fig. 52 Prickly Cockle Outer view

Yetlow Cockle Trachycardium muricatum (Linne) Fig. 53 Height: 1 1/2 in. Range: N. C. - Argentina. Center of shell with smooth ribs, small solid spines on ribs in lateral areas, interior - white and yellow. More common on beaches south of Morehead City.



Outer view

18d. Ribs without spines or elevated scales (ribs may be rough).

Atlantic Strawberry Cockle Americardia media (Linne) Height: 1 1/2 in. Range: N. C. - Brazil. Thick squarish shell with smooth white interior. Occasional - living offshore*.

Giant Atlantic Cockle Dinocardium robustum (Lightfoot)

Height: 4 1/2 in. Range: Va. - British Honduras. Rose to white colored, interior ribbed. Very common - beaches, lives in sounds and shallow offshore waters. Reddish meat makes an excellent chowder.



19a. One end rostrate (pulled out slightly forming a blunt hooklike extension), strong concentric ridges.

Gibb's Clam Eucrassetella speciosa (A. Adams) Fig. 55 Length: 2 1/2 in. Range: N. C. - West Indies. Thick shelled, brown exterior, no palial sinus. Common living offshore*.



- 20a. Chondrophore present in one valve only and, when present, on a horizontal projection (note Fig. 56); one end of live animal widely gaping, a long meaty neck protrudes thru the end.

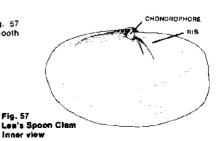
Soft-shell Clam (also Steamer) Mya arenaria Linne Fig. 56

Length: 3 1/2 in. Range: Labrador - S. C. White, thin shell. Large fossil shells frequently on offshore beaches; some small noncommercial-sized clams found in sounds. Forms a major fishery in more northern states.



20b. Both valves with chondrophore, blunt end of shell with curved internal rib running from chondrophore about half way to lower edge.

Lea's Spoon Clam Periptoma leanum (Conrad) Fig. 57 Length: 1 3/4 in. Range: Nova Scotia - N. C. Smooth shell, white. Uncommon - beaches.



20c. No internal rib, one end rounded the other almost pointed, concentric ridges present.

Tellin-like Cumingia Cumingia tellinoides (Conrad) Length: 1 in. Range: Nova Scotia - Fla. Fine concentric ridges, thin. Occasional - beaches; living in sounds and shallow offshore waters attached to drift wood.

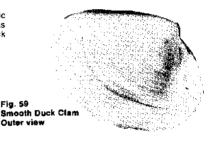
Channeled Duck Clam Anatina plicatetia (Lamarck) Fig. 58 Length: 2 3/4 in. Range: N. C. - Texas. Strong con-

Length: 2 3/4 in. Range: N. C. - Texas. Strong concentric ridges on exterior, very thin shelled, white. Occasionally very common - offshore beaches.



Fig. 58 Channeled Duck Clam Outer View

Smooth Duck Clam Anatina anatina (Spengler) Fig. 59
Length: 2 3/4 in. Range: N. C. - Texas. Fine concentric lines, very thin shell, proportionately longer and less common on offshore beaches than Channeled Duck Clam



21b. Lateral teeth present as strong thin plates.

Fragile Atlantic Mactra Mactra fragilis Gmelin Fig. 60 Length: 2 in. Range: N. C. - Texas. Ends broadly rounded, smooth exterior, beaks central on shell, palial sinus broad and almost under beak. Occasional - beaches; living in sounds and shallow offshore waters.



Fig. 60 Fragile Atlantic Mactra Outer view

Atlantic Suri Clam Spisula solidissima Dillwyn Fig. 61 Length: 4 1/4 in. Range: Novia Scotia - S. C. Ends narrowly rounded, beaks not quite central on shell. Pallal sinus narrow and not extending under beak. Numerous large fossil (?) shells on beaches; known beds of living specimens offshore and north of Cape Hatteras; frequently washed ashore after storms.

The Surf Clam fishery off the coast of New Jersey is the largest active molfuscan fishery in our country.



22a. Large, black brown periostracum, no lunule or palial sinus.

Ocean Quahog or Mahogany Clam Arctica islandica (Linne)

Range: Newfoundland - N. C. Similar in shape and size to Northern Quahog. Beds occur in offshore waters north of Cape Hatteras. Edible.

22b. Elliptical shape - length greater than height, compressed width.

Alternate Tellin Tellina alternata Say Fig. 62 Length: 2 1/2 in. Range: N. C. - Texas. Solid. shiny white, numerous fine but prominent concentric lines. Frequent - offshore beaches. The Georgia Tellin, Tellina nitens C. B. Adams (Range: N. C. - Texas: Occasional - living offshore*), almost identical in shape and sculpture, is smaller and a bright reddish orange.

About 16 Tellins known off our coast and in our estuaries; all but the Great Tellin, Tellina magna Spengler, which may reach a length of 4 1/4 inches. are much smaller than the Alternate Tellin.



Outer view (hole drilled probably by "Shark Eye", note on p. 26)

22c. Oval.

Cross-hatched Lucine Divaricella quadrisulcata Orbigny Fig. 63

Length; 3/4 in. Range: Mass. - Brazil. Inflated width. white with chevron-like sculpture. Common - beaches.

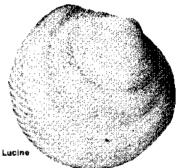


Fig. 63 Cross-hatched Lucine **Outer view**

Buttercup Lucine Anodontia alba Link Fig. 64 Length: 2 3/4 in. Range: N. C. - West Indies. Large inflated specimens with indistinct hinge teeth, no palial sinus, weak concentric sculpture, interior with some crange. Occasional valves - offshore beaches.

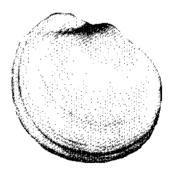


Fig. 64 **Buttercup Lucine Outer view**

White Atlantic Semele Semele proficua (Pultenev) Fig. 65

Length; 11/2 in. Range; N. C. - West Indies. Narrow width, lateral hinge teeth present, concentric lines may be 1/16th inch apart. Infrequent - sounds, shallow offshore waters, and offshore beaches.

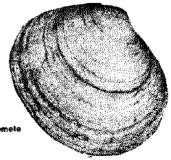


Fig. 65 White Atlantic Semele Outer view

Common Atlantic Abra Abra aequalis (Say) Fig. 66 Length: 1/2 in. Range: N. C. - Texas. Exterior smooth and slightly iridescent, very thin shelled, inflated. Somewhat common on offshore beaches: living common in sounds, mouths of estuaries and shallow offshore waters.

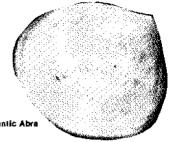
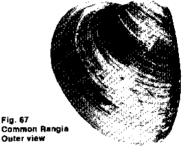


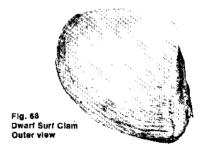
Fig. 66 Common Atlantic Abra Outer view

23a. Heavy thick shell frequently with gray-brown outer skin.

Common Rangia Rangia cuneata (Gray) Fig. 67
Length: 3 1/4 in. Range: Va. - Texas. Shaped somewhat
like a quahog. May be confused with Carolina Marsh
Clam - Polymesoda caroliniana (Bosc.) (Range: N. C. Texas), but the latter has a rough, flaky, dark-brown
outer skin and does not have a chondrophore (triangular
depression) in its hinge area as with the Rangia
clam. Known to be very common in low salinity to
almost fresh water areas of Albemarle and Croatan
Sounds and Neuse and Pamlico Rivers whereas the
Carolina Marsh Clam is found in low-salinity marshy
areas. A small commercial fishery exists for the former;
given certain food technological advances, this fishery
could become one of N. C.'s major fishery resources.



Dwarf Surf Clam Mulinia lateratis (Say) Fig. 68 Length: 3/4 in. Range: Maine to Texas. Tan to ivory colored, radial ridge on pointed end of exterior; small forms very similar to Common Rangia. Common - waters saltier than those containing Common Rangia.



24b. Narrow (almost wedge-shaped) shell without bulbose beak, very thin shell.

Batthic Macoma Macoma batthica (Linne) Fig. 69
Length: 1 in. Range: Arctic Seas (including the Battic
Sea) to Ga. Oval to round in cuttine, beak central.
Very common in low salinities, mud bottom.

Phenax Macoma Macoma phenax Dall Length: 3/4 in. Range: Va. - Fla. Somewhat oblong with beak not quite central, lower edge of shell almost flat and not rounded as the Balthic Macoma. Common, having about same distribution as Dwarf Surf Clam.



GASTROPODS

TUSK-SHELLS, SQUIDS

1a. Shell shaped like a small low cone.

Cayenne Keyhola Limpet Diodora cayenensis (Lamarck) Fig. 70

Length: 1 In. Range: N. J. - Brazil. Numerous ribs radiating from small keyhole-like opening on top of shell, gray to brown coloration. Common - inlets and offshore waters, live attached to rock or shell.

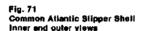


Fig. 70 Cayenne Keyhole Limpet

Shell cap-shaped with a small deck or shelf underneath, Fig. 71, live attached to rock or other shells.

Common Atlantic Slipper Shell Crepidula fornicata (Linne) Fig. 71

Length: 2 1/2 in. Range: Nova Scotia - Texas. Shelf light colored or white - rest of shell darker, shell not strongly arched, pointed end of deck not deep in shell. Common - offshore and sound beaches; frequently attached to each other.





Convex Slipper Shell Crepidula convexa Say

Length: 1/2 in. Range: Mass. - Texas. Shelf or deck same color as rest of shell, shell strongly arched, pointed end with deck deep in shell. Occasionally common - offshore and sound beaches; not living on each other.

Eastern White Slipper Shell Crepidula plana Say

Length: 1 1/2 in Range: Nova Scotia - Texas. White inside and out, shell very flat or with concave shape. Common - sounds and offshore; generally living Inside empty snail shells.

Spiny Slipper Shell Crepidula aculeata (Gmelin)

Length: 1 in. Range: N. C. - Texas. Only Slipper shell with rough or spiny exterior. Occasional - beaches south of Cape Hatteras.

1c. Shell, a small hollow tube - tusk-like, Fig. 72.

About 24 kinds of Tusk-shells have been recorded from off our coast - most are small and from deep water. Live Tusk-shells typically are buried in mud with only the narrow end showing.

Ivory Tusk Dentatium aboreum Conrad

Length: 2 in. Range: N. C. - West Indies. Smooth and shiny surface. Occasional - high or low tide drift lines on offshore beaches (easily missed).

Panelled Tusk Dentalium (aqueatum Verrill

Length: 2 in. Range: N. C. - West Indies. Our largest and heaviest Tusk-shell, has 9 - 12 longitudinal ribs (running the length of the shell). Deep offshore waters (200 - 750 ft. depth).

Texas Tusk Dentalium texasianum Philippi

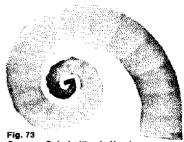
Length: 1 in. Range: N. C. - Gulf States. Hexagonal in cross-section (6 longitudinal ribs). Occasional - high or low tide drift lines of sound or ocean beaches (easily missed).



1d. Shell coiled and looking like a ram's horn.

Common Spirula or Ram's Horn Spirula spirula (Linne) Fig. 73

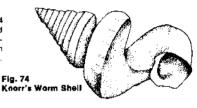
Coil width; about 1 in. Range; Cape Cod - West Indies. Formed inside a living, deep-sea, squid; when animal dies, gas-filled inner chambers cause shell to float. Occasionally common - ocean beaches.



Common Spirula (Rem's Horn)

- Shell coiled and not looking like a ram's horn...
- Not all whorls attached to each other in a tight coil.

Knorr's Worm Shell Vermicularia knorri Deshaves Fig. 74 Range: N. C. - Gulf of Mexico. Tight coil white and about 1/2 in. long, later whorls running without apparent direction; shells may become entangled with each other thus producing large worm-shell masses. Common - ocean beaches, living offshore.



- Shell high spired spire two or more times length of aperature (mouth), (note Figs. 75, 76), whorls joined to each other in a tight coil4.
- Spire less than twice aperature length, (note Fig. 86), whorls joined to each 3b. other in a tight coil......
- 4a. Aperature (mouth) rounded in outline (note Fig. 75). aa. Outside covered by spiral lines.

Eastern Turritella Turritella exoleta (Linne) Length; 2 3/4 (n. Range; N. C. - West Indies, Each

whorl with a strong smooth spiral cord at its top and at bottom - concave between, sharply pointed spire, white with brownish markings, closely related to Worm Shells. Rare - living offshore in deep water.

> bb. Strong rounded ribs on whorls Wentletraps. About 24 known kinds of Wentletraps recorded off N. C. waters. Most are white, rather small, and thus easily passed over. Some known to suck juices from sea anemones. The Precious Wentletrap (up to 2 3/4 in. long and from the Pacific Ocean) is one of the prettiest shells known; while somewhat common now, it was quite valuable in ancient times.

Angulate Wentletrap Epitonium angulatum (Say) Fig. 75 Length: 1 in. Range: N. Y. - Texas. Glossy white, 9 -10 ribs per whorl - each slightly angled on shoulder of whorl. Occasional - ocean beaches.

Brown-banded Wentletrap Epitonium rupicala (Kurtz) Length: 1/2 in. Range: Mass. - Texas. Last whorl with 2 brown spiral bands on a lighter background, other whorls with one band, 12-18 rather weak ribs per whorl. Occasional - beaches; living in our sounds and just offshore.

Humphrey's Wentletrap Epilonium humphreysi (Kiener) Length: 3/4 in. Range: Mass. - Texas. Very similar to Angulate Wentletrap in appearance, habitat and numbers; 8 - 9 ribs per whorl - ribs round and not angulate at shoulder; ribs thicker than those on Angulate Wentletrap.



Reticulated Wentletrap Amaea retifera (Dall) Fig. 76 Length: 3/4 in. Range: N. C. - West Indies. Strawyellow to pale brown color, sculptured by numerous bladelike ribs and spiral ridges - ridges not as strong as ribs. Occasional - living offshore*.



4b. Aperature with notch at bottom (see Figs. 77, 78). aa. Axial ribs low but more prominent than spiral lines.

Atlantic Auger Terebra distocata Say Fig. 79 Length: 1 3/4 in. Range: Va. - Texas. Prominent spiral cord at top of each whorl, both cord and remainder of whorl cut by 20-25 low ribs. Whorls not concave. Common - sounds and offshore on shallow sand flats.



Concave Auger Terebra concava Sav

Length: 1 in. Range: N. C. - Fla. Similar to Atlantic Auger except whorls are concave in outline. Occasional ocean beaches.

bb. Spiral lines quite knobby and more prominent than axial ribs.

Florida Cerkh Cerithium floridanum Morch Fig. 78 Length: 1 3/4 in. Range: N. C. - Texas. Brownish gray exterior, spiral lines well beaded, heavy looking shell. Occasional - beaches, south of Cape Hatteras in sounds and near injets.



- 5a. Aperature (mouth) completely rounded or elliptical, Fig. 86 6. Aperature rounded with upper part (posterior) narrow and apex (where spire
- Sb. should be) with a hole in it.

West Indian Bubble Bulla occidentalis A. Adams Fig. 79 Length: 1 3/4 in. Range: N. C. - West Indies. Smooth, shiny, mottled-brown exterior. Occasional - ocean beaches.



- Aperature narrow.
 - aa. Aperature extending less than 2/3 length of shell and with a large, bulbous, canal-like depression on its inner margin, Fig. 80.

Atlantic Distorsio Distorsio ciathrata (Lamarck) Fig. 80 Length: 2 3/4 in. Range: N. C. - British Guiana. Misshapen, both sides of aperature heavily ridged, brown hairy periostracum, numerous equal-strength axial and spiral ribs which give exterior a knobby appearance. Rare - ocean beaches, occasionally common - living offshore in 100-200 ft. depth south of Cape Hatteras*



	bb. Aperature extending almost length of shell and without a large bulbous,
	canal-like depression on its inner margin
5d.	Aperature wide (not narrow) and having a notch (canal) at its top, its bot-
	tom, or both Fig. 111
6a.	Shell compressed - shell width much greater than shell length, Fig. 82 7.
6b.	Shell length and width nearly equal, Fig. 86
7a.	

Atlantic Carrier Shell Xenophora conchyliophora (Born) Fig. 81 Width: 2 in. Range: N. C. - Brazil, Attached shells cause this to look like a small pile of shells, making detection difficult for the collector. Occasional - living offshore.

Fig. 81 Atlantic Carrier Shell

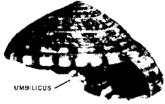


7b. Deep umbilicus (large funnel-shaped hole under shell), Fig. 82.

Common Sundial Architectonica nobilis Roding Figs. 82,

Width: 2 1/4 in. Range: N. C. - Texas. Prominent beaded spiral cords both on top and on bottom, brown spotted. Occasional - ocean beaches, living offshore south of Cape Hatteras (particularly between Cape Hatteras and Cape Lookout)*.

Fig. 82 Common Sundial Side view



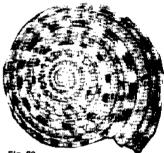


Fig. 83 Common Sundial Top view

7c. No deep umbilicus, Fig. 81.

Common Baby's Ear Sinum perspectivum (Say) Width: † 3/4 in. Range: Va. - West Indies. White, very flat, well named; shall of tive specimens almost completely surrounded by animal - looks like a piece of whitish gristle. Common - ocean beaches and shallow offshore waters.

Fig. 84 Maculated Baby's Ear Bottom view

Maculated Baby's Ear Sinum maculatum (Say) Figs. 84, 85 Width: 1 3/4 in. Rance: N. C. - Fla. Brownish exterior

Width: 1 3/4 in. Range: N. C. - Fla. Brownish exterior and not as flat as Common Baby's Ear, animal reddish-brown spotted. Occasional - living offshore*.



Fig. 85 Maculated Baby's Ear Top view

8a. Interior of aperature (mouth) very shiny and irridescent (nacreous), outer shell surface quite rough, sides of whorls rounded.

Chestnut Turben Turbo castanea Gmelin Fig. 86 Length: 1 1/2 in. Range: N. C. - Brazil. Beaded surface, heavy shell: gray, brown, or greenish exterior. Occasional - ocean beaches, living - inlet areas and offshore.



8b. Interior of aperature irridescent, outer shell sculpture not rough, sides of whorls flat, Fig. 84.

A rather difficult group to identify; at least 16 kinds of Top Shells recorded from our waters, most are small and from areas not accessible to the average collector.

Beautiful Atlantic Top Shell Calliostoma pulchrum (C. B. Adams)

Length: 1/2 in. Range: N. C. - Fla. Spiral beaded ridges stronger near sutures and with reddish spots on yellow-brown surface, no umbilical opening. Occasional - sounds, slightly offshore.

Sculptured Top Shel! Calliostoma euglyptum A. Adams Fig. 87

Length: 1 In. Range: N. C. - Texas. Beaded ridges equal strength, yellow-brown surface with darker brown bars sometimes running width of whorl, no umbilical opening. Occasional - near inlet rock jetties and living offshore*.

Fig. 87 Sculptured Top Shell

Yucatan Top Shell Calliostoma yucatecanum Dall Length: 1/2 in. Range: N. C. - Yucatan. Deep umbilical opening present, yellow to pink base color with darker spots or bars present; broader shell than Sculptured Top Shell. Occasional - living offshore*.

8c. Interior of aperature not irridescent9.

9a. Thin, smooth, bright violet shell (Violet snails).

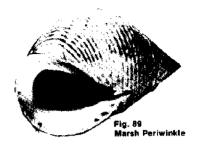
Common Janthina Janthina janthina (Linne) Fig. 88 Width: about 1 in. Top half of shell - light purple, lower half - deep purple, whorts slightly angular in outline. Rare - beaches.

Elongate Janthina Janthina globosa (Swainson)
Length; 1 in. Top and bottom halves nearly similar in color, whorls well rounded. Rare - beaches.



gb. Top-shaped.

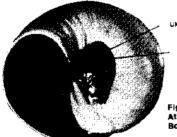
Marsh Periwinkle Littorina irrorata (Say) Fig. 89
Length: 1 in. Range: N. J. - Texas. Thick-shelled, gray-cream color with reddish streak on columella area. Very common - brackish water marshes on marsh grass.



9c. Globular (ball) shaped, smooth surface.
Very active predators, attack other mollusks including relatives by drilling a beveled hole through shell of prey (note hole in Fig. 62). Eggs laid attached to underside of getatinous "sand collars" which they have formed out of sand.

Atlantic Moon Snell (Shark Eye) Polinices duplicatus (Say) Figs. 90, 91
Width: 3 1/4 in. Range: Cape Cod - Texas. Gray,

Width: 3 1/4 in. Range: Cape Cod - Texas. Gray, umbilicus almost covered by large brown button-like callus, (note Fig. 91), operculum (trap door) - horny, light brown and somewhat transparent. Common - sounds, beaches, living offshore."



UMBILICUS GALLUS

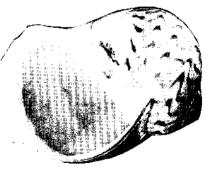
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Fig. 90 Atlantic Moon Snail (Shark Eye) Top view

Fig. 91 Atlantic Moon Snail (Shark Eye) Rottom view

Colorful Atlantic Natica Natica canrena (Linne) Fig. 92 Length: 1 3/4 in. Range: N. C. - West Indies. Yellowtan exterior; white base; numerous radial brown stripes crossed by about 4 large white spiral, brown-spotted stripes; white shelly operculum. Occasional living offshore.

Fig. 92 Colorful Atjantic Natica



Common Northern Moon Snail Lunatia heros (Say) Fig. 93 Length: 4 1/4 in. Range: Canada - N. C. Gray, umbilious not partially closed by a button-shaped callus, horny light brown operculum. Occasional - ocean beaches; not known living south of Cape Hatteras.

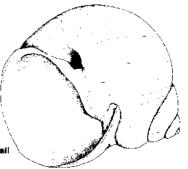


Fig. 93 Common Northern Moon Snail Dwarf White Moon Snail Polinices uberinus (Orbigny) Length: 3/4 in. Range: N. C. - Fla. Glossy white exterior, white button-shaped callus partially closing umbilicus, red horny operculum. Occasional - living offshore*.

10a. Spir	resent		
10b. Spir	ot present		
11a. Exte	shiny		
11b. Exterior surface not shiny, inner and outer margins of aperature heavily ridged.			
aa. Shoulder without knobs, brown-checkered external appearance.			

Reliculated Cowrle-helmel Cypraecassis testiculus Linne Fig. 94

Length: 2 % in. Range: N. C. - Brazil, Shield and outer lip - orange, outer lip with row of dark brown dots, tan-orange exterior with spiral rows of dark brown spots. Rare - living offshore.



Fig. 94
Reticulated Cowrie-helmel

bb. Shoulder with knobs, massive shell up to about 10 1/2 inch length.

Emperor or Queen Helmet Cassis madagascariensis Lamarck Fig. 95

Range: N. C. - West Indies. Large orange shield, white aperature teeth surrounded by dark brown, white exterior with some faint tan markings, ponderous shell. At one time shells common on Cape Lookout beaches; living offshore."



Fig. 95 Emperor or Queen Helmet

12a About 1/2 in. length. Marginellas. About 11 Marginellas recorded from N. C. waters, the following are most commonly collected.

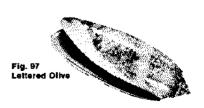
Common Atlantic Marginella Prunum apicinum (Menke) Range: N. C. - West Indies. Golden-brown and usually with 2 - 3 darker spiral bands, 2 - 4 brownish spots on outer aperature lip, differs from Jersey Marginella mainly in its lack of white specks on outer surface; both species frequently confused. Occasional - near inlets and offshore.

Jersey Marginella Prunum roscidum (Redfield) Fig. 96 Range: N. J. - S. C. Light cream background with 3 brownish spiral bands, white flecks covering surface, outer lip marked with 4 brown spots. Occasional living offshore.



12b. Olive shaped, up to about 2 3/4 in, length.

Lettered Olive Oliva sayana Ravenel Fig. 97
Range: N. C. - Gulf States. Cream background with brown zigzag markings. Occasionally common - ocean beaches; living in shallow-water sand flats near inlets and deeper offshore waters.



12c. Cone-shaped, Fig. 98.

Live cones should be handled with care; they can inflict a semi-poisoneous sting.

Floridensis Cone Conus floridensis Sowerby

Length: 1 1/2 in. Range: N. C. - Fla. Light yellow brown exterior with many spiral rows of darker brown and crowded dots. Rare - ocean beaches, occasional living offshore.

Sozon's Cone Conus sozoni Bartsch Fig. 98

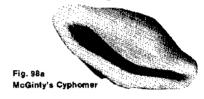
Length: 3 3/4 in. Range: N. C. - Fla. Light yellow orange exterior with 2 large white spiral bands - many light, uneven, brown-spotted spiral lines on top of basic exterior color pattern. Occasional - living offshore*.



13a. Inner and outer margins of aperature (mouth) smooth.

aa. White shell with a humped back, up to about 1 1/4 inch long.

McGinty's Cyphoma Cyphoma mcgintyi Pilsbry Fig. 98a Range: N. C. - Fla. When found living, shell may be almost completely surrounded by living animal - cream colored with dark brown spots. Rare - known living in inlets and offshore south of Cape Hatteras*. Animal lives and feeds on sea whips (sometimes called soft coral).



bb. Thin, fragile, yellow or occasionally light purple shell.

Single-toothed Simnia Neosimnia uniplicata (Sowerby)

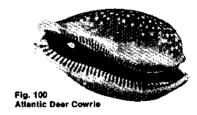
Length: 3/4 in. Range: Va. - West Indies. Color dependant on color of the sea whips which they are feeding on. Best collected in inlets and/or offshore on living sea whips.



13b. Margins of aperature heavily ridged.

Atlantic Deer Cowrie Cypraea cervus Linne Fig. 100 Length: 5 in. Range: N. C. - Yucatan. Light to dark brown with many white spots - color pattern similar to that of a young fawn, teeth on aperature margin dark brown. Rare - ocean beaches, occasional - living off-shore south of Cape Hatteras*.

Atlantic Yellow Cowrie Cypraea spurca acicularis Gmelin Length: 3/4 in. Range: N. C. - Brazil. Yellow with small brown flecks and spots, margin teeth of aperature not colored. Occasional - living offshore".



15a. Exterior marked with spiral rows of large purplish brown spots.

Junonia Scaphella junonia (Shaw) Fig. 101

Length: 5 1/4 in. Range: N. C. - Texas. Cream background under purple spots, folds or ridges on inner edge of aperature (columella). Rare - ocean beaches, living offshore.



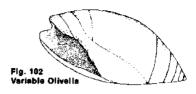
15b. Exterior not marked with spiral rows of large purplish-brown spots. aa. Small, about 1/2 in. long.

Variable Olivella Olivella mutica (Say) Fig. 102
Rango: N. C. - Bahamas. White-cream exterior with about 3 deep reddish-brown spiral bands. Common sandy bottom in sounds, inlets and offshore areas. Closely related to Lettered Olive (p. 27). Of the possibly 6 different Olivellas off our coast, this species may be the most common and easiest to identify.

bb. Shells up to about 9 in long.

Banded Tulip Fasciolaria hunteria (Perry) Fig. 103 Length: 4 1/2 in. Range: N. C. - Texas. Cream-pink background with brown markings on top, a tew thin solid brown spiral lines - lines do not run into aperature, sutures between whorls smooth. Common - sounds and living offshore*.

True Tulip Fasciolaria tulipa (Linne) Fig. 103a Length: 8 3/4 in. Range: N. C. - West Indies. Cream to pink background with light to deep brown spiral bands, numerous darker and broken spiral lines running into aperature, sutures between whorls rough. Occasional living offshore (live specimens have been found in Cape Lookout bight).



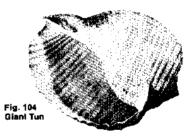




16a. Globular shell

aa. Large, thin-shelled, spire compressed, no parietal shield.

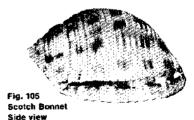
Glant Tun Tonna galea (Linne) Fig. 104 Length: 6 1/4 in. Range: N. C. - Brazil. White to brown, varnish-like outer skin (periostracum), 19 - 21 broad flattened spiral ridges, shell easily broken, tip end of spire (apex) a deep golden brown. Because of fragility, rare on offshore beaches; occasionally common living offshore.



bb. Medium sized, parietal shield with raised pustules or pimples on lower portion.

Scotch Bonnet Phalium granulatum (Born) Figs. 105, 106 Length: 3 1/2 in. Range: N. C. - Brazil. Numerous spiral ridges; white exterior with some spiral rows of brownish-orange square spots; occasionally a thickened rib (varix), representing the remains of an earlier outer lip, present. Fragments common on ocean beaches, whole specimens only occasionally; living common offshore. By act of the North Carolina General Assembly in May 1965, the Scotch Bonnet was named official state seashell in memory of the early Scotch settlers in this state. In doing so, North Carolina became the first state to designate an official state seashell.

The closely related species, Phalium coronadai (Crosse) (see note in Introduction), reaches 4 1/2 in. length, has several rows of low knobs near its shoulder and is colored a solid brownish-tan.





16b. Small, thin spindle-shaped, length of spire greater than length of aperature.

Greedy Dove Shell Anachis avara (Say) Fig. 107 Length: 1/2 in. Range: N. J. - Texas. About 12 smooth ribs on last whorl, ribs cover only top half of whorl, grey. Common - shallow-water sand flats in sounds, inlets, and just offshore.

A similar form, the Well-ribbed Dove Shell, Anachis translitate (Ravenel), has more and stronger ribs and occurs primarily in offshore waters; this mollusk unfortunately is easily confused with a common but as yet unnamed (?) form also occurring in our offshore waters.



	The term of the control of the contr
17a.	Inner margin of aperature (columella) sculptured with spiral ridges running
	into interior (see Figs. 109, 110)18.
	Inner margin of aperature smooth19.
18a.	Very large; spindle-shaped; large specimens covered by a blackish-brown
	flaky outer skin (periostracum) - smaller specimens a dark orange or red to
	brown coloration; no extra large ribs (varices).

Florida Horse Conch Pieuropioca gigantea (Kiener) Fig. 108 Length: 16 1/4 in. Range: N. C. - Mexico. Aperature cream or orange. Closely related to Tulip shells (p. 29).

Length; 16 1/4 In. Hange; N. C. - Mexico. Aperature cream or orange. Closely related to Tulip shells (p. 29). Rare - ocean beaches; occasional - living offshore. One of the largest living gastropods, known to reach over 19 in. length.



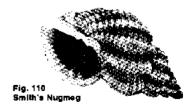
Fig. 108 Florida Horse Conch

18b. Small, two to four raised spiral ridges on inner margin of aperature, no extra large axial ribs (varices).

Common Nutmeg Cancellaria reticulata (Linne) Fig. 109 Length: 1 3/4 in. Range: N. C. - Texas. Cream with several broad brown spiral bands, numerous spiral and slightly beaded cords crossing numerous weak axial ribs. Occasional - living offshore*.



Smith's nutmeg Trigonostoma smithi (Dati) Fig. 110 Length: 1/2 in. Range; N. C. - S. C. (?). Brown - redbrown; 7 - 9 strong, well-rounded axial ribs. Occasional - living offshore (recorded out to about 300 ft. offshore depth).



- 18c. Medium sized, low spiral ridges on inner margin of aperature, small parietal shield may be present.
 - aa. Flattened shell (caused by a large thickened rib on left hand side of the whorl directly opposite to thickened outer lip of aperature on right hand side of shell).

Chestnut Frog Shell Bursa bufo (Bruguiere) ={Bursa spadicea Montfort) Fig. 111

Length: 2 1/4 in. Range: N. C. - Fla. Dark brown and tan, broad spiral strips; upper end of aperature (posterior end) with long and narrow canal. Occasional living offshore.

Freq Shell

Fig. 111 Chesinut Frog Shell

bb. Shell not flattened, live specimens may be covered by a heavy fringed or hairy outer skin (periostracum), not pear-shaped, aperature not as long as total shell length.

Krebs' Triton Cymatium krebsii (Morch)

Length: 2 1/4 in. Range: N. C. - West Indies. White, thin light brown outer skin, last whorl having one major thickened axial rib in addition to its heavy outer lip (inner margin with 6 - 7 strong teeth), 6 - 7 heavy spiral cords on last whorl. Rare to occasional - living offshore.

Poulsen's Triton Cymatium poulsenii (Morch) Fig. 112 Length: 2 3/4 in. Range: Virg. - Venezula. White with thin brown outer skin, last whorl with 18 - 20 strong spiral cords - no axial ribs. Outer lip of aperature not thickened but slightly flared out, thin shelled. Rare to occasional - living offshore".

von Salis' Triton Cymatium parthenopeum (von Salis) Figs. 113, 114

Length: 6 1/8 in. Range: N. C. - Brazil. Brownish-yellow with some darker brown spiral bands, aperature with dark brown blotches, aperature usually with thickened outer lip. 5 - 6 heavy rough spiral cords, heavy thick brown outer skin (Fig. 114). Occasionally common - living offshore*. Before Calico Scallop fishery started a few years ago, this and the other Tritons were almost unknown from N. C. waters by collectors.



Fig. 112 Poulsen's Triton



Fig. 113 von Salis' Triton



Fig. 114
von Salls' Triton
Living specimen with outer skin still
present

cc. Thin, pear-shaped aperature almost as long as total shell length.

Common Fig Shell Ficus communis Roding Fig. 115 Length: 4 1/2 in. Range: N. C. - Mexico. Cream cotored with broken light brown spiral stripes, numerous pronounced spiral ridges crossed by tiner axial riblets. Occasional - living offshore. Do not confuse with Pear Whelk (see p. 32) whose spiral ridges are not crossed by fine axial riblets.



19a. Pear-shaped, large heavy or thin shell, whorks shouldered. More species of whelks are common in North Carolina waters then probably any other east coast U. S. A. locality; beauty and size of specimens are also outstanding. Several are serious Quahog predators. North Carolina Conch Chowder (Carteret County Conch Chowder, etc., if you prefer) is made from these whelks; in Florida, conch chowder or soup is generally made from the Queen Conch (a true Conch) which is closely related to our Florida Fighting Conch (see p. 33). Nomenclature of local whelk species is an unsettled mess. aa. Aperature on left side of whorl.

Lightning Whelk Busycon contrarium (Conrad) Fig. 116 Length: 11 3/4 in. Range: N. J. - Fia. Shoulder of whorl strongly knobbed, very little sculpturing on sides of whorls; large specimens generally white on outside, smaller specimens have numerous brown or brownish purple axial streaks (running top to bottom), aperature may be shaded in yellow to violet tints. Common - sandy bottom in sounds, inlets and just offshore. Major predator on Quahogs.



bb. Aperature on right, heavy shelled with large knobs on whorl shoulder.

Knobbed Whelk Busycon carica (Gmelin) Fig. 117

Length: 11 1/4 in. Range: Mass. - Georgia. Somewhat similar to Lightning Whelk; aperature solid colored or with blotches of dark colors - cream, yellow, orange, dark red, brown. Common - sounds, inlets, and shallow offshore waters; serious clam predator, specimens from offshore waters with whorl exterior colored by axial streaks of brownish-purple (see Lightning Whelk) are believed by some to be another kind of whelk. A heavy form, with noticable spiral ridge or swelling near the lower part of last whorl, occurs below Cape Fear, and may be Kieners Whelk, Busycon eliceans (Montfort).



cc. Aperature on right, thin shelled with no large knobs on whorl shoulder.

Channeled Whelk Busycon canaliculata (Linne) Fig. 118 Length: 7 3/4 in. Range: Mass. - Fla. On shoulders of early-formed whorls there are numerous small knobs, named from the channel occuring at juncture of previous whorl, fine spiral ridges, fuzzy outer skin, aperature colored in shades of yellow, orange, violet. Common sounds and inlets (deeper water areas mainly) and in shallow offshore waters.

Pear Whelk Busycon spiratum (Lamarck) Fig. 118a Length: 5 1/4 in. Range: N. C. - Texas. No small knobs on shoulder whorl, whorls joined to previous whorl at shoulder whereas in Channeled Whelk the whorls are joined below the shoulder of the previous whorl (distance below about equal to width of shoulder); whorl with some broad spiral color bands of brown on cream crossed by thin axial stripes of same color. Shell may be confused with Fig Shell (p. 31). Occasional - living offshore."





19b. Spindle-shaped - whorls not shouldered, thin chalky-white shell, fine spiral lines only.

Stimpson's Colus Colus stimpsoni (Morch)

Length: 4 1/4 in. Range: Labrador - N. C. Brown outer skin, shape similar to that of Tutip shells (p. 29). Possibly our largest gastropod from deep waters, look for only in deep-water fishing trawlers (particularly those engaged in tobster fishing); known in N. C. waters above Cape Hatteras at 900 ft. depth.

19c. Broad spindle-shaped, length about 2 3/4 in., sculpture of strong spiral lines only, thin shell, whorl with angular shoulder...... Poulsen's Triton p. 31

19d. Heavy shelled, outer lip flaring with a notch near the bottom canal (see Fig. 119).

Florida Fighting Conch Strombus alatus Gmelin Fig. 119 Length: 4 1/2 in. Range: N. C. - Yucatan. Light - dark brown; parietal shield area a shiny, metallic, dark reddish-orange to reddish-purple; inside of aperture similarly colored but not metallic; whorl shoulders sharply knobbed. Occasional - ocean beaches particlarly Cape Lookout and Shackleford Banks, known living in depths up to 120 ft., occasionally common living offshore."



Florida Fighting Conch

- 19e. Spiral lines almost as strong as axial ribbing (small ribs which run from top to bottom)
 19f. Large prominent axial ribs spiral ridges not as prominent, occasionally with long narrow bottom canal
 21.
 20a. Small (maximum length: 3/4 in.), prominent parietal shield may be present.
- MUD SNAILS

Common Eastern Nassa Nassarius vibex (Say) Fig. 120 Length: 1/2 in. Range: Mass. - Gulf States. Flattened whorls, ribs coarsely beaded, gray-brown color, prominent cream-colored parietal shield. Very common shallow-water sand flats of sounds, inlets and just offshore.



Eastern Mud Nassa Ilyanassa obsoleta (Say) Fig. 121 Length: 3/4 in. Range: Canada - Fla. Rough dark brown exterior - no prominent axial ribs or spiral ribbing, aperature and parietal shield solid black brown color. Large aggregations found living in intertidal zones of our sounds and inlets.

New England Nassa Nassarius trivittatus (Sav)

Length: 3/4 in. Range: Nova Scotia - Georgia. Prominent beading on whorts - spiral lines as strong as axial ribs, parietal shield small, shaped with higher spire than other Nassas. Occasional - ocean beaches and offshore catches.

Variable Nassa Nassarius albus (Say)

Length: 1/2 in. Range: N. C. - Fla. White exterior sometimes with light brown spiral lines, strong rounded ribs (not flattened) crossed by numerous spiral lines, weak white parietal shield. Occasional living offshore.



20b. Medium sized (maximum length about 4 in.), parietal shield not present. aa. White aperature area, up to about 1 inch length.

Titled Cantharus Cantharus tinctus (Conrad) Fig. 122 Length: 1 1/4 in. Range: N. C. - Texas. Occasionally with light, broad axial ribs, strong spiral ridges; mottled brown and cream exterior; aperature occasionally with some brown blotches. Occasional - rock jetties in inlets, living offshore*. Easily confused with Florida Rock Shell.



bb. Yellow-orange aperature area, up to 3 3/4 inches length.

Florida Rock Shell (Southern Oyster Drill) Thais hae-mastoma floridana (Conrad) Fig. 123

Range: Va. - Brazil. May or may not have several rows of knobs on and just below shoulder of whorl, gray exterior. Found near or on rock jettles and oyster beds occurring near inlets, good population near Ocracoke. Feeds on oysters, etc., in Gulf of Mexico it is a greater threat to the oyster industry than in North Carolina waters.



21a. Short tower canal - canal not a narrow slit, axial ribs equal in size, maximum length about 1 1/2 inches.

aa. Rounded whorls

Atlantic Oyster Drill Urosalpinx cinerea (Say) Fig. 124
Length: 1 1/2 in. Range: Nova Scotia - Fla. 9-12 axial
ribs, gray exterior, aperature frequently violet-colored.
Very common - sounds and inlets on pilings, rock
jetties and oyster reefs; lives in and just below intertidal area. While this is one of the most serious predators of oysters in U.S. waters, its effect on the
industry in North Carolina is not nearly as bad as in
the more northern states.



bb. Whorls with angular shoulders

Caribbean Coral Shell Coralliophia caribaea Abbott Fig. 125

Length: 1 in. Range: N. C. - West Indies. Aperature length noticeably greater than 1/2 total shell length, exterior color a frosty white, aperature color sometimes violet. Occasional - living offshore*.



Fig. 125 Caribbean Coral Shell

False Drill Cantharus multangulus (Philippi)
Length: 1 1/2 in. Range: N. C. - West Indies. Aperature length equal to about 1/2 of total shell length, exterior color - cream-orange, axial ribs more pronunced and squarer than Caribbean Coral-Shell. Occasional - living offshore*.

Thick-lipped Drill Eupleura caudata (Say) Fig. 126 Length: 1 1/2 in. Range: Mass. - Fia. Two to six smaller ribs between last major ribs (varices), sharp angular shoulder on whorl, white exterior (occasionally whorls have several purple spiral bends). Not uncommon in sounds, inlets and just offshore, generally not found in interidal zone. Further north this species also is a very serious cyster predator.



22b. Three ribs (varices) stronger than others.

Apple Murex Murex pomum Gmetin Fig. 126a Length: 3 in. Range: N. C. - Brazil. No long spines on strong ribs. solid or reddish brown and occasionally spirally striped exterior, 4 dark brown spots on inner portion of outer lip of aperature, aperature color frequently pinkish. Rare - ocean beaches, common living offshore.



Lace Murex Murex dilectus A. Adams Fig. 127 Length: 2 3/4 in. Range: N. C. - West Indies. Long foliated spines on each varix (strong rib), cream or light brown exterior sometimes with fine darker brown spiral lines. Rare - living offshore.



22c. More than three strong axial ribs (varices).

Thin Ribbed Murex Murex leviculus (Dall) Fig. 128 Length: 3/4 in. Range: N. C. - Fla. Small, five or more varices with spaces between smooth, varices with erect foliated spines - those on shoulder of whorl curved upwards like a hook, light brown exterior. May be common (easily missed because of size) - living offshore*.



Giant Atlantic Murex Murex fulvescens Sowerby Fig. 129 Length: 7 in. Range: N. C. - Texas. Large heavy shell, 5-10 spiny axial ribs per whorl, raised spiral ridges between axial ribs, spines prominent and erect, exterior color white with fine purple spiral threads, aperature white and porcelaneous. Common - living offshore.

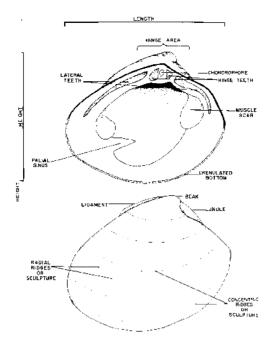


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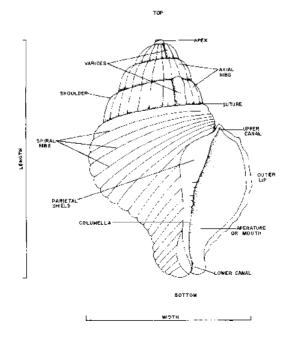
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